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Evaluation of LAUSD's Instructional Technology Initiative

Year 2 Report

Executive Summary

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Executive Summary

The Instructional Technology Initiative (previously called the Common Core Technology Project) is the Los Angeles Unified School District (LAUSD)'s signature investment in technology. Originally planned to provide technology devices to every teacher and student in the 640,000-student district, ITI aimed to transform learning throughout the district by providing interactive and engaging learning environments, supporting implementation of the Common Core State Standards with digital curriculum materials and assessment, and closing the "Digital Divide" by ensuring that all students have access to 21st century technology.

American Institutes for Research (AIR) conducted an external evaluation of the implementation and outcomes of the initiative starting in spring 2014. An Interim Report summarizing findings from Year 1 of the initiative (2013–14) was submitted in September 2014. The present report is intended to provide formative feedback to inform district plans for re-envisioning ITI, based on the first two years of implementation, from which many lessons learned can be gleaned.

The Year 2 Report mainly addresses the period from August 2014 through June 2015, corresponding to Year 2 of ITI. During this period, the initiative expanded in scope to include 101 schools participating as part of four distinct phases:

- Phase 1 included 44 of the 47 schools from the previous year, all of which used iPads.
- Phase 2A included 11 schools for which the district purchased iPads in Year 1. Students in these schools received their devices in fall 2014.
- Phase 2B consisted of 27 schools for which the district had not purchased iPads prior to suspending its purchasing agreement with Apple in August 2014, leaving these 27 schools without devices to distribute to students. Teachers in these schools received their iPads and were invited to participate in all professional development activities.
- Phase 1L included 19 high schools that each selected a mobile computing device other than an iPad.

ITI encompassed several components related to infrastructure, instructional and technical support, and student safety. All devices were bundled with digital curriculum content intended to align with the Common Core State Standards. LAUSD staff provided five professional development workshops throughout the year. The district trained 28 virtual learning complex facilitators (VLCFs) to provide on-site support to teachers with technology integration and to school leadership teams with technology planning. The district also assigned 23 microcomputer support assistants (MCSAs) to provide technical support focusing on configuration of devices, wireless connectivity, and hardware or software malfunctions. The district developed a strategy to promote students' physical and online safety, including Digital Citizenship lessons and monitoring of device security settings, and initiated a policy allowing students to take home devices after their school met five required components specified in a checklist.

The primary evaluation questions addressed in this report are as follows:

1. What is the continuing nature and effectiveness of the district planning and assistance for ITI and other technology-integration programs? What, if any, improvements are recommended to maximize the potential for program success in subsequent years?
2. How was technology used by teachers and students in the ITI and non-ITI schools?
3. In what ways did schools differ with respect to models and strategies for technology integration?
4. Based on a synthesis of the findings, what are the recommendations to the district?[1]

The Year 2 evaluation examined the degree to which the district implemented its planned strategy for ITI during the 2014–15 school year, depicted the progress of schools in implementing local support for technology use, and observed the degree to which technology was integrated in classroom instruction. To accomplish these objectives, we evaluated the district's implementation of the initiative with respect to specific targets, documented major changes in policy or strategy that responded to Year 1 recommendations, conducted site visits to 11 schools, and collected additional data about technology usage. Data sources included the following:

- Key district documents regarding ITI planning and implementation
- Interviews with 14 district leaders, including leaders of the ITI team and other district administrators, as well as focus groups with MCSAs, VLCFs, and Educational Service Center (ESC) area superintendents
- A total of 85 classroom observations conducted in a mix of grade levels and subject areas, in a sample of 10 ITI schools and one non-ITI school implementing its own technology initiative
- Extant data depicting resources offered to schools (e.g., Help Desk requests, VLCF and MCSA staff assignments, wireless infrastructure upgrades, device distribution); instructional support (e.g., VLCF daily activity, professional development participation); and technology use (time spent on Pearson digital curriculum apps, Mobile Device Management [MDM] data for all ITI schools with iPads to capture device usage by teachers and students[2]).

In general, we found that the district and ITI schools made steady progress relative to the previous year, particularly with building essential infrastructure for deploying devices, training teachers, engaging with parents, and providing technical support. At the same time, however, the district has not yet arrived at a solution for several organizational and technical challenges. Ongoing challenges and areas where less progress occurred included: deploying devices in a timely manner, communicating with schools, coordinating efforts with other instructional initiatives, and clarifying a vision for technology use in instruction. The district has publicly acknowledged these challenges and has initiated several efforts to address them. Schools also made progress with implementing key support structures for technology, and classroom

[1] An evaluation question about early student outcomes was not addressed in this report because of the shifting nature of ITI during the 2014–15 school year.
[2] Phase 1L schools with laptops are not included in the MDM data.

technology use appeared to be more frequent than during the previous year. However, the ways that technology was used in the classroom were similar to the last year, and access to and use of high-quality digital resources remained limited.

Our findings are summarized in four sections: District Leadership, Technology Use in Schools, Instructional Support for Schools, and Technical Support for Schools. The findings presented in this summary reflect points of convergence of multiple respondents or data sources; we mention the particular data source where this information is particularly relevant for interpreting the finding. We conclude with a discussion of implications for subsequent technology initiatives in LAUSD and other districts.

District Leadership

ITI is a large and complex initiative. It is housed in the Office of Curriculum, Instruction, and School Support (OCISS) and comprises six functional groups: instructional readiness, instructional/content development, safety, organizational change management, technical, and asset management. In this section, we provide a summary of district leadership pertaining to four topics: (1) deployment and readiness; (2) safety and security; (3) coordination with related initiatives and among ITI teams; and (4) communication with schools, parents, and the public at large.

Deployment and Readiness. In 2014–15, the district deployed 35,781 iPads to 54 Phase 1 and Phase 2A schools, and 10,879 devices to 12 Phase 1L schools. As in Year 1, however, the district had challenges related to the amount of time required for device setup and personalization, and the district's process for deployment was not sufficiently scalable to enable all schools to receive devices at the beginning of the school year. Many schools' deployment dates were pushed back, some to as late as January or February 2015; the district had difficulty with communicating deployment dates in advance due to uncertainty about when its staff would have devices set up and ready for distribution. Deployment once again consumed considerable time of MCSAs and VLCFs, and delays in receiving devices discouraged some teachers from making the commitment to integrate technology into their classroom activities. Many schools' deployment dates were pushed back, some to as late as January or February 2015. The district made some progress with increasing the efficiency of deployment, such as improving coordination with schools with deployment logistics and involving students and school staff in device setup. In the coming 2015–16 school year, the district plans to deploy approximately 70,000 devices to students. To ensure that schools and students receive these devices in a timely manner, **we recommend that the district consider and implement additional steps to automate the provisioning of devices and to shift greater responsibility for deployment to school staff who are trained and have adequate time allocated to deployment activities.** This will require working with device vendors to eliminate the technical challenges involved with personalization. Also, the district should provide training to school staff to prepare them to assume responsibility for personalization and inventorying during deployment, with fewer district staff needed on-site to lend assistance.

Internal district reports indicate that ITI schools were, for the most part, technically ready for deployment in Year 2. Most schools received infrastructure upgrades, and all secondary schools met the district's criterion for sufficient bandwidth; however, 40 percent of elementary schools

did not meet the district's bandwidth criterion, an issue that needs further attention by district technology leaders. Furthermore, school-based staff reported frequent difficulties with wireless connectivity.

The district developed three resources to ensure schools' instructional readiness: an Instructional Technology Planning Course through which school leaders would develop a school instructional technology plan, the Technology Readiness Checklist, and a take-home policy and its checklist. The district did not communicate to schools that completion of these resources was a requirement for deployment in 2014–15; no schools in fact completed the planning course, and many schools did not complete the checklist prior to deployment (although nearly all did so at some point during Year 2). By spring 2015, the district had made the development of a school instructional technology plan a condition for deployment for the 2015–16 school year and had begun to offer a four-day summer planning institute during which school teams would develop their plans. **We recommend that the district make completion of the Technology Readiness Checklist an additional condition for deployment,** inasmuch as this checklist includes specific details that may not be included in school instructional technology plans.

Safety and Security. In Year 2, the district expanded its existing safety and security strategies by:

- Enacting a take-home policy that listed requirements schools would need to meet before sending devices home with students. Among the requirements was obtaining the active consent of 90 percent of parents.
- Expanding its digital citizenship education strategy by including it in the take-home and technology-readiness checklists, and promoting it during Digital Citizenship Week.
- Training school staff on asset management and device management systems.

Twenty-six ITI schools implemented device take-home during the 2014–15 school year, beginning in November 2014. All but one of these schools were secondary schools. Our Year 2 evaluation findings suggest that device take-home was generally successful; there were no major negative incidents noted among any of our data sources. Parents generally had few concerns about device take-home, and school staff saw two benefits: It alleviated the burden of distributing devices on a daily basis, and it enabled students to use the devices for homework. However, the actual benefits of device take-home were not clear. Our data did not indicate the degree to which teachers and students made use of device take-home for out-of-school learning experiences—largely due to the fact that device take-home was implemented late in the school year. Future evaluation efforts should examine the ways that devices are used outside of school for academic and nonacademic purposes.

School-based stakeholders indicated that most schools offered digital citizenship lessons to students. Although some stakeholders continued to express concern about the physical safety of the devices—parents especially worried about their liability for lost or stolen devices—or the physical safety of students carrying the devices, others, including parents and students, expressed the opinion that student training and district tracking greatly reduced risks to the devices or students. Through the take-home checklist, the district made it mandatory for schools to provide students with introductory lessons on Internet safety and cyberbullying. **We recommend that the district encourage schools to go beyond the introductory lessons and to treat digital citizenship as an ongoing conversation among staff and students**. The district should

encourage schools to share these resources with parents and engage them in conversations about device liability and student safety, especially when implementing take-home policies.

In Year 2, the district offered workshops to train school staff on asset management (i.e., tracking device location, condition, and assignment) and device management (i.e., to monitor and change device settings and download apps). The latter training, however, did not include use of systems compatible with devices other than iPads. **We recommend that the district develop a comparable device management training for those schools that have chosen devices besides iPads (e.g., laptops and Chromebooks).**

Coordination With Other Initiatives and Within the ITI Team. ITI was not well-coordinated with other, related initiatives during the first two years of implementation. The ITI team was not integrated with other offices within OCISS or with ESCs (now referred to as local districts), and district leaders did not set the expectation that ITI and other district offices should coordinate with each other. Due to their lack of ownership, these existing units did not coordinate with ITI on concurrent instructional initiatives; in some cases, these initiatives were actually at cross-purposes with ITI. As a result, professional development for initiatives such as Common Core implementation did not reflect ITI content, and vice versa. Leaders of other initiatives believed it was impractical to integrate content related to ITI because of the relatively small number of ITI schools that would find the content relevant. For the 2015–16 school year, the district is devolving to local districts the responsibility for supporting schools with managing device inventory and overseeing their technology integration. Presumably, there will still need to be central-office-level coordination and direction for the initiative. **We recommend that the district reorganize the ITI team so that it is no longer a separate entity within OCISS, and that it becomes integrated within existing offices.** Improved coordination with ongoing initiatives would improve the coherence of the initiative and would provide additional opportunities for reinforcing ITI goals and strategies.

Within the ITI team itself, the instructional and technical staff had difficulty coordinating their response to technical challenges, such as whether and how to assign Apple IDs to students. Current structures, such as weekly team meetings, were not seen as useful in fostering cooperation across instructional and technical staff. Team members stated that ITI functional teams were not held accountable for meeting deadlines for completion of tasks, with repercussions for other teams (a finding reported in Year 1 as well). The lack of accountability reflected a project plan that was not sufficiently developed with respect to roles and responsibilities. **We recommend that the ITI director and team leads, under the guidance of the initiative's executive sponsors, develop a detailed project plan that specifies tasks, roles, and responsibilities.**

Communication. District communication with schools was realized primarily through direct interaction with principals, through e-mails, monthly principal meetings, and VLCFs. However, despite the district's implementation of its communication system to schools, stakeholders reported that some of the information the district conveyed was not sufficiently clear (especially information about deployment and security policies), and that the information presented at principals' meetings was not sufficiently relevant. **Considering the importance placed on the monthly principals' meetings, we recommend the district enhance the usefulness and relevance of these meetings by targeting presentations to different school levels or phases.**

This could involve offering breakout sessions for different phases, school levels, or schools in pre-or post-deployment. Finally, the district had success with conveying information through VLCFs and should continue this tactic as well, providing VLCFs with the information they need to provide regular updates about the initiative to school-level staff.

The district made progress in communicating about the initiative with parents, through the development of a parent engagement plan and presentation materials for schools to deliver. Most of the 11 schools we visited in winter/spring 2015 held parent meetings about technology, and more than half of the schools also offered technical training to parents; some of these schools used or adapted the district materials in engaging with parents. However, as with communication with teachers, parent engagement was largely the purview of school principals, who could choose whether or how much of the district materials to pass on to parents, and thus parent engagement activities varied by school. In general, relying on school leaders to convey information to teachers and parents is not an unreasonable strategy, as long as the district makes its expectations clear. **We recommend that the district state its expectations to school leaders for their role in communicating with parents and teachers about the initiative, and monitor whether and how schools are meeting these expectations.** The district would then have feedback about whether school leaders are communicating with teachers and parents as expected.

In its communication about the initiative to the general public during Year 2, the district emphasized its change in vision for the initiative and its willingness to consider changes to its procurement of devices and funding source. Administrators believed that the district had not yet succeeded in communicating about the initiative's purpose and value, stemming in part from the district's own lack of a clear vision. They further believed that a clearer message about the initiative's vision will follow from the recommendations of the ITI task force.

Technology Use in Schools

Evaluation findings indicate that classroom technology use was more prevalent in 2014–15 than it was found to be in 2013–14, although these differences may reflect the fact that our observations were conducted at different times of the school year. What did not seem to change was the way in which teachers and students were using technology. In both years, teachers primarily used technology for whole-class instruction (e.g., projecting an assignment on a screen in front of the class); this use did not take advantage of the 1:1 device availability for students. The next most frequent technology use, observed in 40 percent of classrooms, was students searching the Internet. Students used devices for interactive lessons or activities in about one third of the classrooms; this use did leverage the 1:1 device availability, and some of these interactive lessons included embedded assessments/checks for understanding. We did not observe as much use of devices for creating or presenting projects as in the prior year; again, this was likely due to the difference in timing of the site visits. The apps we observed or that teachers reported to have used seemed limited in their potential to engage students in new or exciting learning opportunities. The use of the Pearson digital curriculum app was generally low; ITI schools used the Pearson digital curriculum most in upper-elementary mathematics. In summary, teachers and students frequently used the technology, but not yet in ways that transform teaching and learning as envisioned by the initiative. Our recommendations for improving classroom technology use are included in the following sections on instructional and technical support.

Instructional Support for Schools

The Year 1 evaluation reported that educators required more robust instructional support for technology integration. The district made progress with enhancing instructional support in 2014–15, although our findings indicate that teachers require substantially more support to use technology effectively. In this section, we summarize findings related to three types of supports.

Teacher Training. The district developed and offered five centralized professional development workshops focused on technology integration, meeting its own targets for expanding professional development offerings. A common sentiment among district and school staff was that this set of workshops was not sufficient to prepare teachers to use technology for instruction. Some district- and school-level respondents expressed the need for workshops on additional topics that were geared toward teachers with differing levels of expertise. Most of these workshops were focused on iOS-based tools, thus excluding schools using devices other than iPads. **We recommend that the district develop and offer additional workshops that meet the needs of schools using devices other than iPads and that are differentiated with respect to the level of technology expertise expected of participants.** Relatively few teachers per school attended the workshops offered, for reasons that some teachers ascribed to inconvenient times and locations. **We recommend that the district consider offering training webinars to enable teachers to participate during contractual time at their school.**

In Year 1, VLCFs had limited time to provide instructional support due to the need to assist with deployment and address technical issues. To address this limitation, in Year 2 the district expanded the ranks of VLCFs (from 14 to 28), formalized their training, and provided additional supervision. VLCFs and school staff concurred that VLCFs provided ongoing coaching and professional development to teachers. Moreover, in schools with higher levels of technology implementation, school staff considered the VLCF to be an integral part of on-site integration support. The frequency of this support, however, did not meet district expectations during Year 2. A continued constraint on the VLCFs' time for instructional support was the number of operational and technical responsibilities that required their attention. **We recommend that the district consider ways to maximize VLCFs' time spent on instructional support.** It is crucial to encourage schools to eventually build their internal capacity for supporting and coaching technology use, for example, by providing released time to a teacher at each school to serve as an instructional technology coach in addition to the VLCF.

Instructional Resources. The district did not procure digital instructional resources as intended, and our findings from site visits indicated that teachers and students used only a limited set of apps. **We recommend that the district seek ways to provide access to high-quality digital resources, aligned to standards and curricula, to teachers in varying grade levels and subject areas.** At a minimum, teachers could benefit from a list of recommended applications and programs. Better integration of the ITI team within OCISS, as previously noted, could potentially put more resources at the disposal of the initiative to assist with the vetting of digital resources.

Time. In some schools, we found that administrators built time into teachers' schedules to collaborate about technology and learn from each other. **We recommend that the district encourage principals to provide teachers with opportunity to try new resources and**

strategies, discuss them with teacher teams, and observe technology implementation in each other's classrooms. Related to the issue of time was the concern, noted particularly by VLCFs, that concurrent instructional initiatives competed for the time and attention of school staff. As already mentioned, further integration of ITI into the local districts appears to be a strategy that the district is pursuing for bringing increased coherence among initiatives in the coming years.

Technical Support for Schools

Consistent with recommendations in the Year 1 evaluation, the district provided resources for technical support to ITI schools along with training opportunities to build internal school capacity. The district assigned each school an MCSA to provide on-site support and increased the number of MCSAs assigned to ITI schools from 14 (in 2013–14) to 23 (in 2014–15). However, the ratio of MCSAs to schools did not meet district targets for appropriate staffing. Only about half of Help Desk tickets were resolved in less than one week (the district's target for response time), and staff in some schools expressed concern about the delayed response to requests and the amount of time that MCSAs were present in their schools.

The district has encouraged schools to develop internal technical support systems, and schools have begun to do so in different ways. Many schools reported drawing upon a dedicated technology lead or team to solve simple issues. Schools that had established these internal support systems generally reported satisfaction with technical support.

As in Year 1, we found that technical problems (e.g., obtaining Apple IDs, updating apps, and connecting to Wi-Fi) were a barrier to the integration of technology. Teachers expressed fears that lessons they planned would fall short if the technology failed to work for any reason. It is therefore crucial for establishing and maintaining teacher buy-in to ensure that adequate technical supports are in place in every ITI school, with systems in place for teachers to access appropriate support resources. It also should be acknowledged that some technology problems experienced by teachers reflected larger systemic issues and must be addressed at a higher level than school-focused technical support. **We recommend the district develop a coordinated response to systemic technical issues. In particular, the district should work with device vendors to develop a process for device personalization that is manageable for schools and districts**.

Cross-Cutting Themes

School Leadership. ITI schools in our case study sample that showed the greatest progress in implementation tended to have principals who communicated a clear actionable vision, established a technology leadership team and secured strong technology support, and supported ongoing professional development and collaboration around integrating technology into instruction. These principals relied on district resources (including VLCFs) to some degree, but also secured locally based support. Strong leadership was a facilitating factor that tended to outweigh other barriers to technology implementation. **We therefore recommend that the district continue to support school leaders with workshops that develop their understanding of and capacity to lead technology implementation, and that these workshops be evaluated as to their quality and usefulness.**

Underutilization of Resources. One theme that runs throughout several of the key findings is the apparent underutilization by ITI schools of the tools and resources the district developed to support technology implementation. As in any instructional initiative, successful implementation depends on the willingness of schools to use the resources and tools. We found that at least some schools used the parent engagement materials (although the extent of parent participation was unclear), and most schools provided introductory digital citizenship lessons, yet the extent to which schools used the full range of these materials is not known. Furthermore, many schools did not take advantage of professional development workshops, train-the-trainer sessions, and MDM or asset management training. **As ITI moves forward and continues to evolve, it will be important to refine the district (central office or local districts') supports to ensure that they are perceived to be high quality and relevant for school leaders and teachers.**

Vision for Technology Integration. A lack of clear district vision for instructional technology use was perceived to hinder communication of the importance and value of technology in schools to the general public. In addition, some school staff lacked clear understanding about how they were supposed to integrate technology into instruction. The relatively infrequent "transformative" use of technology that leveraged the 1:1 device allocation to students may be symptomatic of this lack of guidance. In spring 2015, the district began to address this issue by convening its ITI Task Force to develop the district's vision. In the meantime, the district expected schools to develop their own vision as part of their School Technology Plan; each ITI school will be required to complete such a plan by October 2015. The district should continue to support schools as they develop their own vision and plan for technology use.

Equitable Resources for Non-iPad Schools. The district has not yet developed as extensive a set of resources for schools with laptops or Chromebooks as it has for iPad schools. Most of the professional development workshops offered by the district targeted only users of iOS-based devices (i.e., iPad users), some of the parent engagement presentations were applicable only to iPad users, and the district had not yet developed device management training sessions (i.e., for management of apps and security settings) for users of Windows-based devices and Chromebooks. Given the multiplicity of devices available to Phase 1L schools, the district will be challenged to provide resources and trainings that are applicable to them. **We recommend that the district evaluate the different experiences of users with different devices in order to understand whether the district is providing appropriate supports to all types of users, and to understand the benefits and limitations of different devices.**

Discussion

With the Instructional Technology Initiative, the Los Angeles Unified School District launched an ambitious effort to address persistent concerns about equity and access to 21st century learning opportunities for students in the district. At the end of two years of implementation, the initiative is at a point of transition. The district has restructured the leadership of the initiative, is reframing its vision, and has negotiated new contracts with vendors while reconsidering its funding sources. At this point, it is appropriate for the district as well as other interested and invested stakeholders to reflect on a number of important lessons learned from the evaluation of ITI in its first incarnation, to inform their subsequent technology initiatives.

In general, the district showed progress in several areas related to supporting the deployment and integration of devices into pilot schools between spring 2014 and spring 2015 (the timeframe for our evaluation). Much time and effort went into deployment, safety and security and take-home policy. These areas of attention were absolutely necessary for the rollout to happen, but yet, attention to these areas left too little time and resources to be directed toward coordination with other initiatives and supporting integration into instruction. A lack of alignment with instructional initiatives, curricula, and other professional development in the district (particularly in the local districts) seemed to be a key barrier—at least some school-level educators could not reconcile the competing pressures on their time and instructional foci in the classroom, in ways that allowed them to maximize the use of technology.

Still, technology *was* used by many teachers and students in ITI pilot schools, and this finding is important. From both the MDM records and our classroom observations, we know that the devices were not locked away all school year in schools in which devices had been deployed. Levels of use appeared to increase from 2013-14 to 2014-15, and it is reasonable to expect that use will continue to rise if the devices remain in the schools, as long as they are kept in working order. As for how the devices are used, our results suggest that the uses of devices in 2014-15 were similar to how they were used the year prior. A small proportion of teachers within ITI schools seem to use them for interactive instruction that leverages the 1:1 configuration. More common is use of the devices for Internet research to support the creation of projects and presentations. Although these are each potentially promising uses of technology when integrated into broader learning goals, it does seem that ITI schools lacked access to clear information about innovative, high quality apps and digital lesson content to incorporate into their instruction (a notably common problem in other studies of technology implementation; Enyedy, 2014) In the absence of a recommended set of apps or digital curricula, some teachers will find ways to sort through the expansive content available online (including open educational resources) to build into their lesson plans. But many will not, due to time constraints and other barriers. LAUSD teachers could benefit from a more concentrated, centralized effort to identify and curate high quality, standards-aligned digital content to use in their classrooms.

In addition to increasing use of devices generally, our case study analysis reveals several pockets of promise related to school culture and teacher collaboration around technology use. VLCFs became true partners to teachers and school leaders in some schools, where they seemed to encounter greater openness to trying new approaches with technology. In our site visits, we uncovered a number of exciting and promising examples of teacher sharing and professional learning and student involvement in device rollout and upkeep, suggesting that the development of school technology culture was well underway in at least some schools during the 2014-15 school year. Interestingly, some of the schools that were further along in their implementation of technology and the development of collaboration and culture to support technology integration were those whose deployment dates had been delayed. It was not necessarily that additional time with the devices made the differences; it is possible that in a few cases, having some time and space to plan together, within their own local context, was beneficial.

The ITI encountered a number of operational challenges, as well as challenges with public perception about the initiative. While the overarching vision for the initiative—to provide LAUSD students with access to technology—remained the same, the goals for rollout and scale-up shifted often over the course of this 1¼-year evaluation. To gain more traction and public

support during these very early years of implementation, the ITI would have needed to take root in pilot schools quickly enough to allow them to show more uptake and progress. This is not unique to technology implementation; this is true for any educational reform under pressure to demonstrate its worth to stakeholders essentially immediately.

The existing research base provides some hypotheses for the pieces that needed to be in place in order for the ITI to take root in pilot schools quickly enough to show more progress. For example, Penuel (2006) and Valiente (2010) emphasize the importance of school leadership to champion one-to-one computing and a shift toward student-centered pedagogy enabled by technology. Essential infrastructure includes connectivity to the wireless network, the devices themselves, and technical and instructional support for teachers (Argueta et al., 2011; OET, 2015; Valiente, 2010). Other prior research suggests that that essential components of technology integration into the classroom include professional learning (Fixsen et al., 2007; OET, 2015; Staples, Pugach, & Himes, 2005), school culture (Billig, Sherry, & Havelock, 2005; Glazer, Hannafin, & Song, 2005), and organizational support (AbbottGreenwood, Buzhardt, & Tapia, 2006; Fixsen et al., 2007). Of critical importance is the development of a clear vision shared among educators (Valiente, 2010), and that the vision is tied to concrete strategic plans.

LAUSD's approach to the ITI demonstrated awareness of these necessary factors – there were formal or informal structures in place to address all of them (e.g. change management, VLCFs, technology and instructional readiness planning, professional development courses). But the district's efforts and schools' own ITI-related activities did not result in the establishment of these necessary factors within and across the pilot schools, as our case study analysis from 2014-15 makes clear. At the district level, LAUSD's ITI team worked to put into place many of the key supporting ingredients that would enable schools to make use of the devices they were provided as powerful tools for teaching and learning. But in the early stages of the initiative, the ITI's project management strategies were not able to concurrently address all of the aspects of deployment, training, support, coordination, and alignment.

At its heart, the ITI is about both technology and instruction, and effective management of it required coordination and communication between technical and instructional teams and leaders. The structure of LAUSD (and many other districts) is such that the instructional division is separate from the technical division. These divisions did not seem reach a level of collaboration that would be needed to avoid the challenges ITI encountered, and on some issues seemed to be unable to resolve differences in perspective (for example, on issues related to Apple IDs). The significant role of the local districts in setting instructional goals created still greater need for coordination in order for the ITI to be seen as a priority – and an opportunity for teaching and learning – at the school level. The plan to decentralize the ITI out of central office and to the local districts for school year 2015-16 may alleviate some of these challenges, but is sure to raise others. The key ingredients – alignment, coordination, communication – will remain essential.

Achieving meaningful technology integration is difficult and takes time (Davies & West, 2014; Shapley, Sheehan, Malone, & Caranikas-Walker, 2010). Although the desire is for positive change to be immediate, the reality is that educational settings are complex and implementation processes take time. Evidence suggests successful implementation of technology (and non-technology) initiatives require a cyclical process of systematic planning, implementing and refining processes to foster change in the system (Center for Technology Implementation, 2013;

Fixsen, Naoom, Blase, & Wallace, 2007). Leveraging technology for transformational change in schools and classrooms requires more than a commitment to purchase and disseminate the equipment (Penuel, 2006, Valiente, 2010). Rather, it is a process that unfolds over time through the sustained efforts of district and school leaders and teachers. Educators within and beyond LAUSD can draw upon the experiences over the last two years as they continue to seek ways to teach, inspire, and prepare their students for a technology-rich future..

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